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Myobiid Mites (Acarina, Myobiidae) Parasitic on Bats in Japan

VI. Genus *Pteracarus* Jameson et Chow, 1952 (Part 2)

With 3 Text-figures

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ABSTRACT *Pteracarus pipistrellius pipistrellius* (Radford), *Pteracarus minutus daubentoni* Dusbábek, *Pteracarus minutus japonicus* subsp. nov. and *Pteracarus macfarlarei* Fain were added to the fauna of Japan. Fine structure of the male genital plate was regarded as an important measure for grouping allied species or subspecies that infested phylogenetically related host bats.

In addition to the two mites of the genus *Pteracarus* dealt with in the previous paper (Uchikawa, 1978), the following four species and subspecies were taken from Japanese bats of the family Vespertilionidae. All the four species and subspecies are new to Japan.

3. *Pteracarus pipistrellius pipistrellius* (Radford, 1938)

Material examined. 2 ♂♂, 1 ♀, ex *Nyctalus lasiopterus*, Sapporo, Hokkaido, Japan, 25–V–1967 (coll. Dr. Maeda). The type host of this mite is *Pipistrellus pipistrellus*.

4. *Pteracarus minutus daubentoni* Dusbábek, 1973

Material examined. 3 ♂♂, 4 ♀♀, 1 female tritonymph, ex *Myotis nattereri*, Obirano-dô Cave, Miyazaki Prefecture, Japan, 6–VIII–1974 (coll. Mr. Irie); 2 ♂♂, 3 ♀♀, ex *Myotis nattereri*, Kinppo Village, Kagoshima Prefecture, Japan, 3–V–1975 (coll. Mr. Irie). The type host of this mite is *Myotis daubentoni*.

5. *Pteracarus minutus japonicus* subsp. nov.

(Figs. 1–2)

Male (Fig. 1). Setae *vi* minute; *sc i* located distinctly anteriad from *sc e*. Geni-

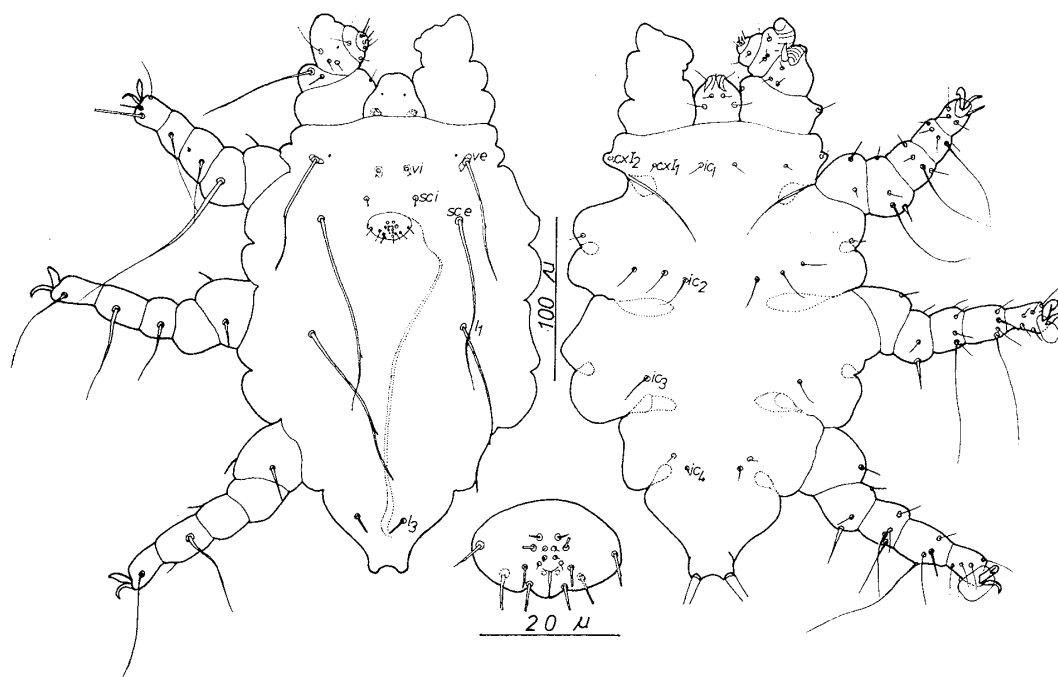


Fig. 1. *Pteracarus minutus japonicus* subsp. nov., male; A, dorsal view; B, ventral view; C, genital region.

tal pore situated on slightly posterior level of *sc e*; genital plate spreading anteriorly beyond basal level of *sc e*. Setae *d*₁ on slightly posterior level of genital setae *ge*. Penis very long. Distance between *ic*₁ and *cxI*₁ subequal to that between *cxI*₁ and *cxI*₂.

Measurements in microns (holotype and 5 paratypes in parentheses). Body (=gnathosoma+idiosoma) 300 (285–290) long by 180 (165–180) wide; *ve* 75 (65–73); *vi* about 3; *sc e* 110 (100–118); *sc i* 6 (4–5); *d*₁ 7 (7–9); *d*₂ 7 (7–9); *l*₁ 120 (100–110); *ic*₁–*cxI*₁ 25 (22–27); *cxI*₁–*cxI*₂ 27 (23–28); ventral spine on tibia III 10 (8–11); ventral spine on tibia IV 13 (12–13); penis about 200.

Female (Fig. 2). Setae *sc i* almost on basal level of *sc e*, and slightly shorter than *vi*. Setae *l*₃ slightly longer than *l*₄. Distance between *ic*₁ and *cxI*₁ subequal to that between *cxI*₁ and *cxI*₂. Dorsal setae on tibiae IV not so strongly inflated.

Measurements in microns (allotype and 2 paratypes in parentheses). Body 340 (355–370) long by 255 (268–275) wide; *ve* 78 (80–84); *vi* 12 (13–13); *sc e* 133 (130–140); *sc i* 10 (12–12); *d*₄ 5 (5–5); *d*₅ 7 (6–6); *l*₁ 128 (130–140); *l*₃ 20 (23–28); *l*₄ 13 (15–15); *ic*₁–*cxI*₁ 30 (27–28); *cxI*₁–*cxI*₂ 30 (30–30); ventral spine on tibia III 10 (10–10); ventral spine on tibia IV 15 (15–15).

Female tritonymph. Only a single specimen was available. Body 320 μ long by 248 μ wide. Dorsal setae consisting of *ve*, *sc e*, *sc i*, *l*₁, *l*₃, *l*₄ and *l*₅. *Sc e* and *l*₁ conspicuous, 68 and 72 μ long, respectively; *l*₃ thickened and 30 μ long; *l*₄ 20 μ long; *l*₅ fine and only about 60 μ long. Setae *ic*_{1–4}, *cxI*_{1–2} (modified into peg-like ones),

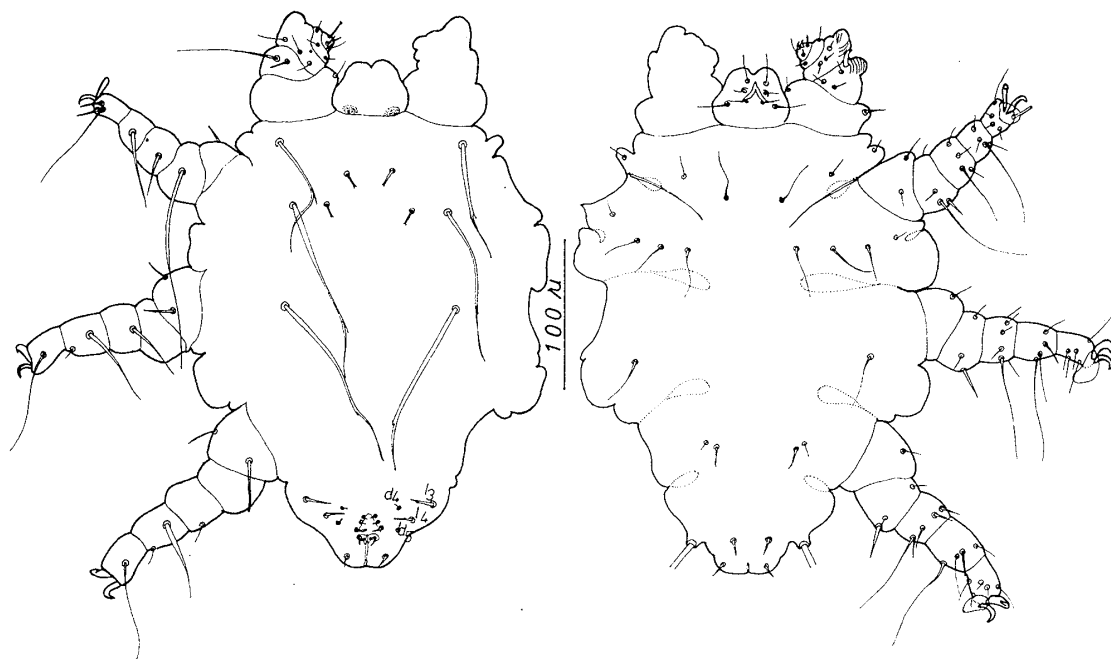


Fig. 2. *Pteracarus minutus japonicus* subsp. nov., female; A, dorsal view; B, ventral view.

$cxII_{1-2}$ present ventrally. Legs I symmetrical; legs II–IV each with 4 free segments, femur and genu fused into a segmet; one each of thickened and striated seta dorsally on tibiae II–IV. Claw formula on legs II–IV: 1–1–1.

Material examined. Holotype male, allotype female, 5 paratype males, 2 paratype females, 5 males and a female tritonymph, ex *Myotis macrodactylus*, Nukabira, Hokkaido, Japan, 1–VIII–1967 (coll. Dr. Maeda); 1 male from the same host, Tosayama, Kôchi Prefecture, Japan, 1–VIII–1969 (coll. Miss Yoshiyuki). The holotype and allotype are deposited in the collection of the National Science Museum (Nat. Hist.), Tokyo (NSMT–Ac 9280), and other specimens in the collection of the author.

Diagnosis. According to the structure of the genital plate, the present mite is relegated to a subspecies of *Pteracarus minutus* (Radford), which has thus far been subdivided into the nominate subspecies, *daubentoni* Dusbábek, *occidentalis* Dusbábek and *tricolor* Fain. The nominate subspecies and *tricolor* Fain are separable from the other three subspecies, inclusive of the present new subspecies, by their short penes. *P. minutus daubentoni* Dusbábek and *P. minutus occidentalis* Dusbábek, which are barely differentiated from each other by the differences in length of some idiosomal setae, quite resemble *P. minutus japonicus* subsp. nov. The following features are, however, specific to the new subspecies: Setae *sc i* situated distinctly anteriad from the basal level of *sc e* (in the male); the genital plate spreading anteriorly beyond the basal level of *sc e* (in the male); and setae l_3 longer than l_4 . The female tritonymph of *P. minutus daubentoni* Dusbábek, which was also taken in the present study, is a single immature stage thus far known for the formerly described

Table 1
Measurements in microns for *Pteracarus macfarlanei*
Fain from different *Murina* bats.

| Host species Locality Female (n) | <i>M. huttoni</i> Malaysia (1, holotype) | <i>M. leucogaster</i> Osaka-fu, Japan (7) | <i>M. aurata ussuriensis</i> Iwate, Japan (4) |
|--|--|---|---|
| Body length | 325 | 360–415 (381.4)** | 335–410 (372.5) |
| Body width | 200 | 230–260 (241.0) | 205–265 (235.0) |
| <i>ve</i> | 65 | 68– 86 (75.9) | 67– 81 (72.8) |
| <i>vi</i> | 8 | 7– 9 (8.1) | 8– 10 (9.0) |
| <i>vi-vi</i> | 29 | 28– 31 (29.6) | 30– 35 (31.3) |
| <i>sc e</i> | 115 | 118–145 (134.3) | 128–140 (133.5) |
| <i>sc i</i> | 5 | 4– 5 (4.7) | 4– 5 (4.5) |
| <i>sc i-sc i</i> | 45 | 52– 58 (54.0) | 50– 57 (52.5) |
| <i>d₄</i> | 5 | 4– 5 (4.6) | 4– 5 (4.8) |
| <i>d₅</i> | 7 | 6– 8 (6.6) | 5– 8 (6.5) |
| <i>l₁</i> | 98 | 115–135 (126.3) | 110–133 (122.8) |
| <i>l₃</i> | 12 | 12– 20 (15.3) | 11– 18 (13.8) |
| <i>l₄</i> | 15 | 12– 17 (14.2) | 13– 16 (14.3) |
| <i>ic₁-cxI₁</i> | 25 | 23– 28 (26.6) | 25– 28 (26.8) |
| <i>cxI₁-cxI₂</i> | 25 | 25– 28 (26.4) | 23– 30 (25.5) |
| <i>ic₄</i> | 10 | 10– 13 (12.3) | 10– 13 (11.5) |
| <i>ic₄-ic₄</i> | 8 | 8– 10 (9.3) | 9– 13 (11.0) |
| Spine on tibia III | 10 | 10– 12 (10.7) | 8– 12 (10.0) |
| Spine on tibia IV | 12 | 11– 13 (12.1) | 10– 13 (11.8) |
| Male (n) | (1, allotype)* | (4) | (2) |
| Body length | 273 | 280–310 (293.8) | 245–255 |
| Body width | 156 | 180–220 (195.0) | 160–160 |
| <i>ve</i> | 51 | 58– 73 (66.8) | 60– 68 |
| <i>vi</i> | — | 3– 5 (3.5) | 3– 3 |
| <i>vi-vi</i> | — | 17– 20 (18.3) | 20– 20 |
| <i>sc e</i> | 93 | 113–130 (124.8) | 118–125 |
| <i>sc i</i> | — | 4– 5 (4.3) | 3– 3 |
| <i>sc i-sc i</i> | — | 30– 37 (33.0) | 27– 30 |
| <i>d₁</i> | — | 7– 9 (8.0) | 5– 6 |
| <i>d₂</i> | — | 8– 10 (8.8) | 10– 11 |
| <i>gm₁</i> | — | 7– 7 (7.0) | 14– 14 |
| <i>l₁</i> | 80 | 103–118 (112.0) | 100–103 |
| <i>l₃</i> | 5 | 8– 12 (10.3) | 8– 8 |
| <i>ic₁-icI₁</i> | — | 25– 25 (25.0) | 25– 25 |
| <i>cxI₁-cxI₂</i> | — | 25– 25 (25.0) | 23– 24 |
| <i>ic₄</i> | — | 8– 9 (8.5) | 8– 9 |
| <i>ic₄-ic₄</i> | — | 8– 8 (8.0) | 8– 8 |
| Spine on tibia III | — | 8– 10 (9.3) | 8– 8 |
| Spine on tibia IV | — | 10– 12 (10.5) | 10– 10 |
| Penis | 145 | 173–175 (174.5) | 160–163 |

* Cited from Fain (1978). ** Mean.

subspecies of *P. minutus* (Radford). The same stage of the present new subspecies bears distinctly longer setae *sc e* and *l₁* and weaker setae *l₅* than corresponding ones of *P. minutus daubentoni* Dusbábek.

6. *Pteracarus macfarlanei* Fain, 1973.

Material examined. 2 ♂♂, 3 ♀♀, ex *Murina aurata ussuriensis*, Hayachine, Iwate Prefecture, Japan, 15–VIII–1968 (coll. Miss Yoshiyuki); 1 ♀ from the same host, Nagiso, Nagano Prefecture, Japan (coll. Dr. Miyata).

According to Fain (1978), the genital plate of the male of *Pteracarus macfarlanei* Fain bears conspicuous setae, *d₁*, *d₂*, *gm₁* and *gm₂*, and 6 pairs of minute setae, which are named *gi* and *ge* series of setae by Dusbábek (1973). The figure 39 in Fain (1978) shows that *d₁*, *d₂* and *gm₁* gain length in this order. The setae on the males from *Murina aurata ussuriensis* well accord with the above descriptions. However, the setae are subequal in length or *gm₁* is rather inferior to *d₁₋₂* on the specimen from *Murina leucogaster* as presented in Table 1 and Fig. 3. The author would describe this form as a subspecies of *P. macfarlanei* Fain, if he had sufficient specimens from various localities to deny variation in the relative length of the setae. Measurements are presented in Table.

Material examined. 4 ♂♂, 9 ♀♀, ex *Murina leucogaster*, Higashinose Village, Osaka-fu, Japan, VI–1967 (coll. Dr. Maeda).

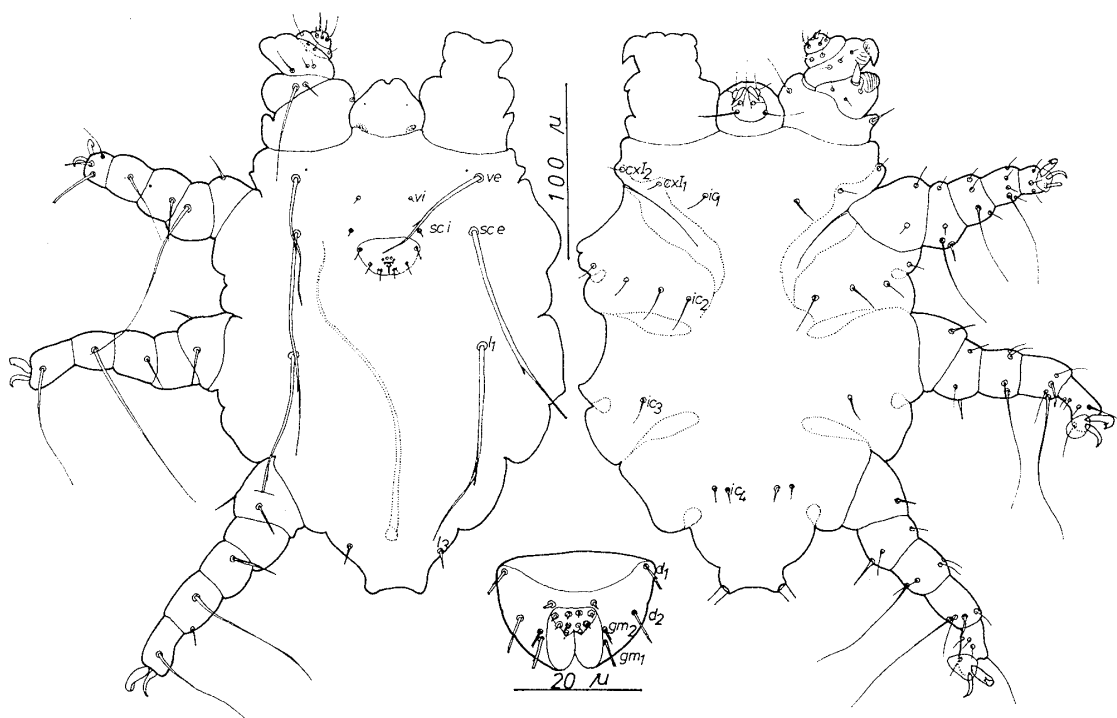


Fig. 3. *Pteracarus macfarlanei* Fain, male from *Murina leucogaster*; A, dorsal view; B, ventral view; C, genital region.

DISCUSSION

Mites of the genus *Pteracarus* are thought to be typically oligoxenic, that is, a mite species occurs on two or more bats of a genus or related genera (Dusbábek, 1973). In the present study, *P. pipistrellius pipistrellius* (Radford) that had been restricted to the bat genera *Pipistrellus* and *Scotophilus* (Dusbábek, 1973) was recorded from *Nyctalus lasiopterus*, the third host species. According to the figures in Dusbábek (1973), the genital plates of *P. pipistrellius* subsp. and *P. tibialis* Dusbábek, which has been recorded from *Myotis* spp. and *Nyctalus noctula*, are essentially the same. The structural similarity in the genital organ of some species has been regarded as an evidence to show a close affinity among such species even if each species has other remarkable, respective characteristics. Thus, the above two mites constitute a species-group, and are suggestive of a relation among the host bat genera, *Myotis*, *Pipistrellus*, *Nyctalus* and *Scotophilus*.

Pteracarus minutus daubentoni Dusbábek and *P. minutus japonicus* subsp. nov. were taken from Japanese *Myotis* bats. These mites differ distinctly from *P. minutus minutus* (Radford), the male of which was originally found on an unidentified bat from Kenya. However, according to the similarity in the genital plate, the former two mites as well as the other two (Dusbábek, 1973; Fain, 1974) are regarded as the subspecies of *P. minutus* (Radford). *P. minutus daubentoni* Dusbábek, which had been recorded from *Myotis daubentoni*, the type host, and from *Myotis myotis*, was taken from *Myotis nattereri*, while *P. minutus japonicus* subsp. nov. was thus far specific to *Myotis macrodactylus*. This indicates that *M. macrodactylus* is phylogenetically remote from the other three bats, though all the four bats resemble one another in the external morphology. The nominate subspecies was once reported to occur on *Miniopterus schreibersii* (Dusbábek, 1973). Recently, however, another *Pteracarus* mite, which is believed to be a specific parasite of *M. schreibersii*, has also been presented (Uchikawa, 1978).

It is very interesting that the structure of the genital plate of *Pteracarus macfarlanei* Fain is essentially the same as those of *P. minutus* subsp. This indicates that the host bat genus, *Murina*, is related to *Myotis*. *Murina* and *Myotis* are characterized by the respective dental formula, and are relegated into the different subfamilies, Murinae and Vespertilioninae, of the family Vespertilionidae. Any of several possible interpretations on the close affinity of *Pteracarus* mites parasitic on these bat genera has not yet been consented.

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